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Spider

SPIDER

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SPIDER

SPIDER is a small, eight-legged animal that spins silk. Spiders are best known for the silk webs they spin. They use their webs to catch insects for food. Even insects that are larger and stronger than spiders cannot escape from the threads of a spider's web.

All spiders spin silk, but some kinds of spiders do not make webs. The bolas spider, for example, spins a single line of silk with a drop of sticky silk at the end. When an insect flies near, this spider swings the line at it and traps the insect in the sticky ball.

All spiders have fangs, and most kinds of spiders have poison glands. A spider's bite can kill insects and other small animals, but few kinds of spiders are harm-

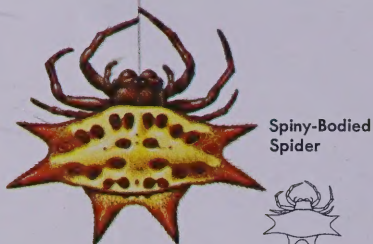
ful to man. In North America, only six kinds of spiders have bites that can harm man. These spiders are the brown recluse spider, the sack spider, the black widow, the brown widow, the red-legged widow, and the varied widow. Of the four "widow" spiders, only the females are known to bite man. Many persons are afraid of spiders. But only hurt or frightened spiders bite human beings.

Spiders are helpful to man because they eat harmful insects. Spiders eat grasshoppers and locusts, which destroy man's crops, and flies and mosquitoes, which carry diseases. Some large spiders eat such animals as mice, birds, lizards, frogs, and fish. Spiders even eat each other. Most female spiders are larger and stronger than male spiders, and often eat the males.

Spiders live anywhere they can find food. They can be seen in fields, woods, swamps, caves, and deserts.

The Color, Shape, and Size of Spiders vary greatly. Some crab spiders slowly change color from white to yellow to match the flowers in which they hide. The spiny-bodied spider, hanging from its dragline, looks like a chip of wood. Some kinds of comb-footed spiders are less than 1/50 of an inch long, and are among the world's smallest spiders. South American tarantulas are the world's largest spiders. One tarantula was 10 inches long with its legs extended.

Spiders shown other than natural size are accompanied by a drawing showing natural size. All spiders shown are females except where noted.



Tarantula



One kind of spider spends most of its life under water. Another kind lives near the top of Mount Everest, the world's highest mountain. Some spiders live in houses, barns, or other buildings. Others live on the outside of buildings—on walls, on window screens, or in the corners of doors and windows.

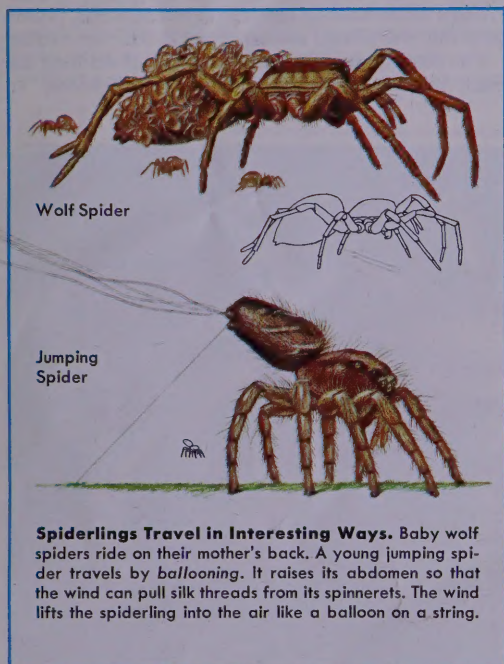
There are more than 29,000 known kinds of spiders, but scientists believe there may be as many as 50,000 kinds. Some kinds are smaller than the head of a pin. Others are as large as a man's hand. One spider, a South American tarantula, measured 10 inches long with its legs extended.

Many persons think spiders are insects. But scientists classify spiders as *arachnids*, which differ from insects in many ways. Spiders have eight legs. Ants, bees, beetles, and other insects have six legs. Most insects have wings and *antennae* (feelers), but spiders do not. Other arach-

nids include daddy longlegs, scorpions, and mites and ticks.

Scientists classify spiders as either *true spiders* or *taran-tulas* according to certain differences in their bodies. Spiders can also be divided according to their way of life. *Web-spinning spiders* spin webs to trap insects. *Hunting spiders* run after insects or lie in wait for them. For the scientific classification of spiders, see the table *Common Kinds of Spiders* at the end of this article.

H. K. Wallace, the contributor of this article, is Chairman of the Department of Zoology at the University of Florida. Willis J. Gertsch, the critical reviewer, is Curator of Arachnids at the American Museum of Natural History, and author of American Spiders. The illustrations throughout this article were prepared for WORLD BOOK by Jack J. Kunz unless otherwise credited.



Wolf Spider

Jumping Spider

Spiderlings Travel in Interesting Ways. Baby wolf spiders ride on their mother's back. A young jumping spider travels by *ballooning*. It raises its abdomen so that the wind can pull silk threads from its spinnerets. The wind lifts the spiderling into the air like a balloon on a string.

The Bolas Spider does not trap insects in a web. Instead, it spins a line of silk with a drop of sticky silk at the end. The spider swings the line at an insect and traps it in the sticky ball.



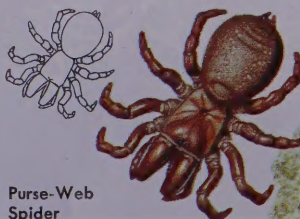
Bolas Spider



The Ogre-Faced Stick Spider traps flying insects in a web of sticky silk. With its four front legs, this spider stretches the web to several times its normal size and captures the insect.

Ogre-Faced Stick Spider

The Purse-Web Spider extends the silk lining of its burrow up the side of a tree to make a tube-shaped web. The spider bites through the tube to seize insects crawling over its web.



Purse-Web Spider



Black Widow

The Female Black Widow is one of the few spiders that can harm man. It has a red or yellow patch, shaped like an hourglass, on its abdomen.

SPIDER / The Spider's Body

Spiders may be short and fat, long and thin, round, oblong, or flat. Their legs are short and stubby, or long and thin. Most spiders are brown, gray, or black. But some are as beautifully colored as the loveliest butterflies. Many of these spiders are so small that their colors can be seen only with a microscope.

A spider has no bones. Its tough skin serves as a protective outer skeleton. Hairs, humps, and *spines* (bristles of skin) cover the bodies of most spiders.

A spider's body has two main sections: (1) the *cephalothorax*, which consists of the head joined to the *thorax* (chest); and (2) the *abdomen*. Each of these sections has *appendages* (attached parts). A thin waist called the *pedicel* connects the cephalothorax and the abdomen.

Eyes. A spider's eyes are on top and near the front of its head. The size, number, and position of the eyes vary among different species. Most species have eight eyes, arranged in two rows of four each. Other kinds have six, four, or two eyes. Some species of spiders that live in caves or other dark places have no eyes at all.

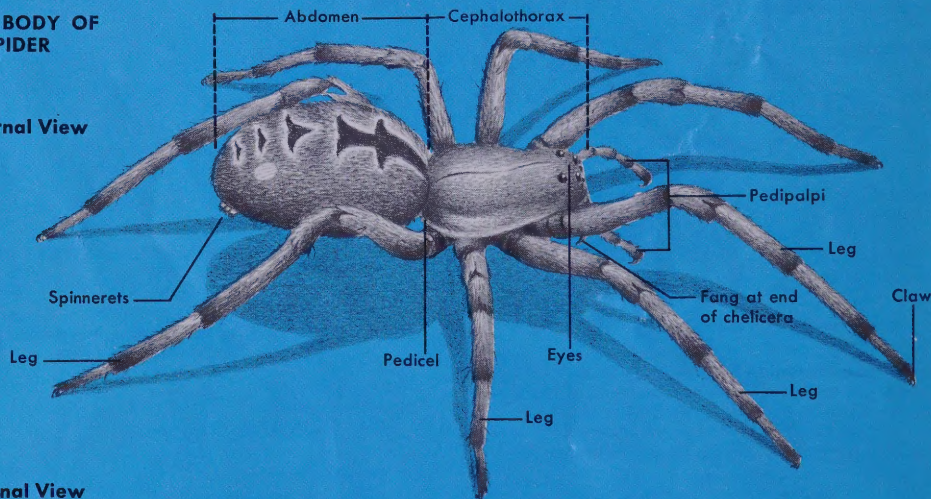
Mouth. A spider's mouth opening is below its eyes. Spiders do not have chewing mouth parts, and they eat only liquids. Various appendages around the mouth opening form a short "straw" through which the spider sucks the body fluid of its victim. The spider can eat some of the solid tissue of its prey by *predigesting* it. To do this, the spider sprays digestive juices on the tissue. The powerful juices dissolve the tissue. By predigestion and sucking, a large tarantula can reduce a mouse to a small pile of hair and bones in about 36 hours.

Chelicerae are a pair of appendages that the spider uses to seize and kill its prey. The chelicerae are above the mouth opening and just below the spider's eyes. Each chelicera ends in a hard, hollow, pointed claw, and these claws are the spider's fangs. An opening in the tip of the fang connects with the poison glands. When a spider stabs an insect with its chelicerae, poison flows into the wound and paralyzes or kills the victim.

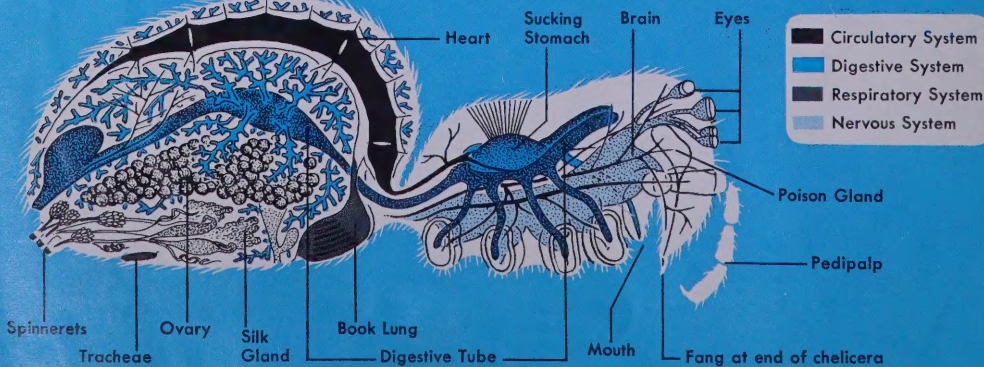
The fangs of tarantulas point straight down from the head, and the poison glands are in the chelicerae. In

THE BODY OF A SPIDER

External View



Internal View



true spiders, the fangs point crosswise, and the poison glands extend back into the cephalothorax.

Spiders also crush their prey with their chelicerae. Some species use their chelicerae to dig burrows in the ground as nests.

Pedipalpi are a pair of appendages that look like small legs. One pedipalp is attached to each side of the spider's mouth, and they form the sides of the mouth opening. Each pedipalp has six *segments* (parts). In most kinds of spiders, the segment closest to the body bears a sharp plate with jagged edges. The spider uses this plate to cut and crush its food. In male spiders, the last segment of each pedipalp bears a reproductive organ.

Legs. A spider has four pairs of legs, which are attached to its cephalothorax. Each leg has seven segments. In most kinds of spiders, the last segment has two or three claws at the tip. A pad of hairs called a *scopula* may surround the claws. The scopula helps the spider cling to such surfaces as ceilings or walls.

When a spider walks, the first and third leg on one

side of its body move with the second and fourth leg on the other side. Muscles in the legs make the legs bend at the joints. But spiders have no muscles to extend their legs. The pressure of the blood in their bodies makes their legs extend. If a spider's body does not contain enough fluids, its blood pressure drops. The legs draw up under the body, and the animal cannot walk.

Spinnerets are short, fingerlike organs with which the spider spins silk. They are attached to the rear of the abdomen. Most kinds of spiders have six spinnerets, but some have four or two. The tip of a spinneret is called the *spinning field*. The surface of each spinning field is covered by as many as a hundred *spinning tubes*. Through these tubes, liquid silk flows from silk glands in the spider's abdomen to the outside of its body. The silk then hardens into a thread.

Respiratory System. Spiders as a group have two kinds of breathing organs—*tracheae* and *book lungs*. Tracheae, found in almost all kinds of true spiders, are small tubes which carry air throughout the body. Air enters the tubes through the *spiracle*, an opening in front of the spinnerets in most kinds of true spiders.

Book lungs are in cavities in the spider's abdomen. Air enters the cavities through a tiny slit on each side and near the front of the abdomen. Each lung consists of 15 or more thin, flat folds of tissue arranged like the pages of a book. The sheets of tissue contain many blood vessels. As air circulates between the sheets, oxygen passes into the blood. Tarantulas have two pairs of book lungs. Most true spiders have one pair.

Circulatory System. The blood of spiders contains many pale blood cells and is transparent. The heart, a long, slender tube in the abdomen, pumps the blood to all parts of the body. As the blood circulates, it flows through open passages instead of closed tubes, such as those of the human body. If the spider's skin is broken, the blood quickly drains from its body. The animal's tough skin often prevents this from happening.

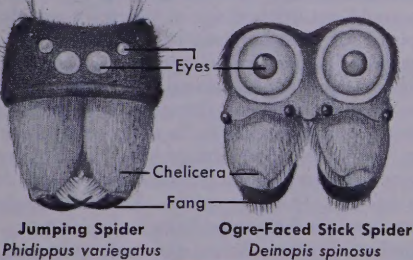
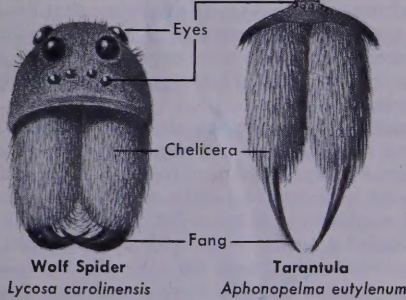
Digestive System. A digestive tube extends the length of the spider's body. In the cephalothorax, the tube is larger and forms a *sucking stomach*. When the stomach's powerful muscles contract, the size of the stomach increases. This causes a strong sucking action that pulls the food through the stomach into the intestine. Juices in the digestive tube break the liquid food into particles small enough to pass through the walls of the intestine into the blood. The food is then distributed to all parts of the body.

Nervous System. The central nervous system of a spider is in the cephalothorax. It includes the brain, and controls the activities of all other parts of the body.

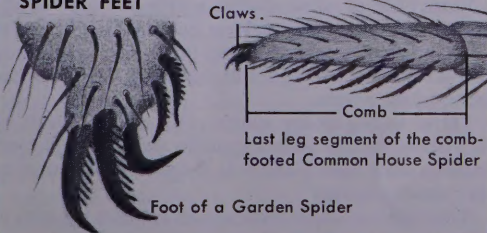
A spider gains knowledge of its surroundings through its sense organs. Most kinds of hunting spiders can see better than web-spinning spiders. But all spiders can see only a short distance. The sense of touch is the most highly developed of the animal's senses. Special hairs on its body serve as organs of touch and perhaps as organs of hearing and smell. Each hair contains a nerve. These nerves send messages to the brain that tell the spider how to respond to changes in its surroundings. Spiders can easily sense vibrations and the presence of certain chemicals.

WORLD BOOK Illustrations by Tom Dolan

SPIDER FACES



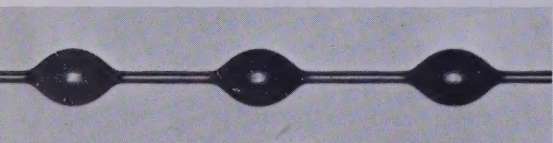
SPIDER FEET





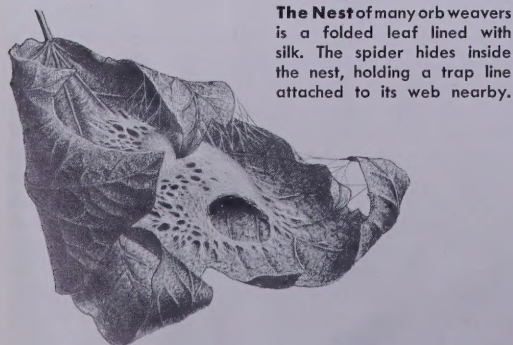
Jerome Wexler, NAS

Many Kinds of Spiders Spin Bands of Silk to tie up insects caught in webs. The orange garden spider turns its victim over and over, wrapping it in silk from the spider's spinnerets.



T. Eisner, © 1967 American Assoc. for the Advancement of Science

A Thread of Sticky Silk, enlarged more than 20 times, looks like a beaded necklace. Insects stick to the thread. Oil on the spider's body prevents the silk from sticking to the spider.



The Nest of many orb weavers is a folded leaf lined with silk. The spider hides inside the nest, holding a trap line attached to its web nearby.

How Spiders Make Silk. Spiders as a group have seven kinds of silk glands. No species of spider has all seven kinds. All spiders have at least three kinds of silk glands, and most species have five. Each kind of gland produces a different type of silk that the spider uses for a particular purpose.

Some silk glands produce a liquid silk that becomes dry outside the body. Other glands produce a sticky silk that stays sticky.

The spinnerets, which spin the silk, work somewhat like the fingers of a hand. A spider can stretch out each spinneret, pull it back in, and even squeeze them all together. Using different spinnerets, a spider can combine silk from different silk glands and produce a very thin thread or a thick, wide band.

The animal also can make a sticky thread that looks like a beaded necklace. To do this, the spider pulls out a dry thread that is heavily coated with sticky silk. Using the claws of one of its hind legs, the spider stretches this thread and lets go of it with a snap. This action causes the liquid silk to form a series of tiny beads along the thread. A spider uses beaded threads in its web to trap jumping or flying insects.

Some kinds of spiders have another spinning organ called the *cribellum*. It is an oval plate that lies almost flat against the abdomen, in front of the spinnerets. Hundreds of spinning tubes cover the spinning field of the *cribellum*. These tubes produce extremely thin threads of sticky silk.

Spiders with a *cribellum* also have a special row of curved hairs called a *calamistrum* on their hind legs. Spiders use the *calamistrum* to comb together dry silk from the spinnerets and sticky silk from the *cribellum*. This combination forms a flat, ribbonlike silk structure called a *hackled band*. Spiders use hackled bands in their webs, along with the other silk they spin.

How Spiders Use Silk. Spiders, including those that do not spin webs, depend on silk in so many ways that they could not live without it. Wherever a spider goes, it spins a silk thread behind itself. This thread is called a *dragline*. The dragline is sometimes called the spider's "lifeline" because the animal often uses it to escape from enemies. If danger threatens a spider in its web, it can drop from the web on its dragline and hide in the grass. Or the spider can simply hang in the air until the danger has passed. Then it climbs back up the dragline into its web. Hunting spiders use their draglines to swing down to the ground from high places.

Spiders also use silk to spin tiny masses of sticky threads called *attachment discs*. They use the discs to attach their draglines and webs to various surfaces.

Each kind of spider builds a different type of silk nest as its home. Some spiders line a folded leaf with silk to make a nest. Others dig burrows in the ground and line them with silk. Still others build nests in the center of their webs.

Many web-spinning spiders spin sticky bands or wide sheets of silk while capturing their prey. The orb weavers wrap their victims in sheets like mummies so they cannot escape.

The female spider of most species encloses her eggs in an *egg sac*, a bag made of a special kind of silk.

SPIDER / Hunting Spiders

Hunting spiders creep up on their prey or lie in wait and pounce on it. Most kinds of hunters have large eyes and can see their prey from a distance. The powerful chelicerae of hunting spiders help them overpower their victims. Some hunting spiders spin simple webs that stretch out along the ground and stop insects. These spiders are grouped as hunters because they run after the insects that land in their webs.

Jumping Spiders creep up and pounce on their prey. They have short legs, but they can jump more than 40 times the length of their bodies. Jumping spiders are the most colorful of all spiders. Many thick, colored hairs cover their bodies. Most of the males have bunches of brightly colored hairs on their first pair of legs.

Water Spiders are the only spiders that live most of their life underwater. This spider breathes underwater from air bubbles that it holds close to its body. Its underwater nest is a silk web shaped like a small bell. The spider fills the web with air bubbles, which gradually push all the water out of the bell. The animal can live on this air for several months. Water spiders are found only in Europe and parts of Asia. See ANIMAL (How Animals Breathe [picture]).

Tarantulas are the world's largest spiders. The biggest ones live in the South American jungles. Great numbers of tarantulas also are found in the southwestern United States.

Many kinds of tarantulas dig burrows as nests. The *trap-door spider* covers the entrance to its burrow with a lid (see TRAP-DOOR SPIDER). A California tarantula builds a *turret* (small tower) of grass and twigs at the entrance to its burrow. It sits on the tower and watches for insects moving in the nearby grass. See ANIMAL (Animals of the Tropical Forests [picture]); TARANTULA.

Fisher Spiders live near water and hunt water insects, small fish, and tadpoles. These spiders have large bodies and long, thin legs. But because of their light weight, they can walk on the water without sinking. They are sometimes called *nursery-web weavers* because the female builds a special web for her young.

Crab Spiders have short, wide bodies and look like small crabs. They can walk backwards and sideways as easily as crabs do. Some brightly colored crab spiders hide in flowers and capture bees and butterflies. A few kinds of crab spiders can disguise themselves by changing the color of their bodies to match the color of the flower blossom. *Huntsman spiders* are large, tan crab spiders of the southern United States.

Funnel-Web Spiders hunt only within large webs that they spin in tall grass or under rocks or logs. The bottom of the web is shaped like a funnel and serves as the spider's hiding place. The top part of the web forms a large sheet of silk spread out over grass or soil. When an insect lands on the sheet, the spider runs out of the funnel and pounces on the victim.

Wolf Spiders are excellent hunters. Many kinds have large, hairy bodies, and run swiftly in search of food. Others look and act like other types of spiders. For example, some live near water and resemble fisher spiders in appearance and habits. Others live in burrows, or spin funnel-webs. See ANIMAL (Animals of the Mountains [picture]).



A Jumping Spider leaps into space after its prey, and floats to the ground on a dragline.



Water Spiders live underwater in airtight silk nests. There they eat, molt, mate, and raise families.



Many Tarantulas dig burrows as nests. This male tarantula of the southwestern United States is shown half its actual size.



A Female Fisher Spider stands guard over her egg sac after enclosing it in a special nursery web.



A Grass Spider spends its life spinning one funnel web. The female leaves the web only to build an egg sac.



SPIDER / Web-Spinning Spiders



The Common House Spider spins a loosely-woven tangled web of dry silk, held in place by long threads attached to walls or other supports. The center of the web forms a large insect trap.



The Platform Spider spins a silk sheet below a net of criss-crossed threads. Flying insects hit the net and fall onto the sheet.



The Bowl-and-Doily Spider spins a bowl-shaped sheet above a flat sheet of silk. Threads above the bowl stop flying insects.



The Triangle Spider spins a triangular web between two twigs. The web's *hackled bands* of dry and sticky silk trap insects.



The Filmy Dome Spider spins a tangle of threads around a dome-shaped silk sheet, and hangs under the dome. Insects that drop onto the dome are pulled through the webbing by the spider.



The Labyrinth Spider spins a tangled web as its hiding place and an orb web as an insect trap. Several trap lines extend from the center of the orb web to the tangled web.

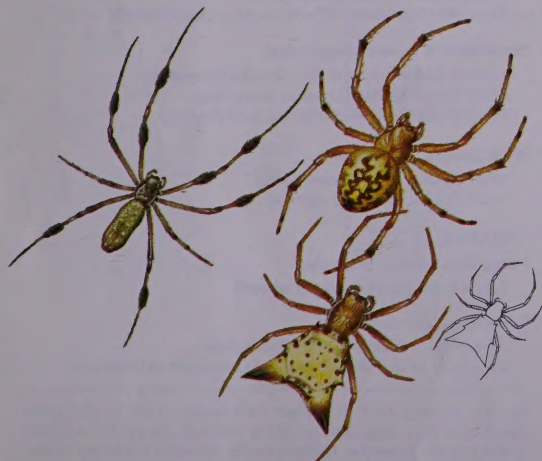
spins a web that is made up largely of hackled bands. The web is only about as large as a postage stamp. This spider spins a structure of dry silk to hold the sticky web in place. With its four rear legs, the spider hangs upside down from the dry silk. It holds the sticky web with its four front legs. When an insect flies near, the spider stretches the sticky web to several times its normal size and captures the insect.

Sheet-Web Weavers weave flat sheets of silk between blades of grass or branches of shrubs or trees. These spiders also spin a net of crisscrossed threads above the sheet web. When a flying insect hits the net, it bounces into the sheet web. The spider, which hangs upside down beneath the web, quickly runs to the insect and pulls it through the webbing. Sheet webs last a long time because the spider repairs any damaged parts. *Dwarf spiders*, which are less than $\frac{1}{8}$ of an inch long, spin small, square sheet webs near rivers and lakes.

Some sheet-web weavers spin two separate sheets as a web. The spider hangs upside down under the top sheet. The sheet beneath the spider probably protects it from attack from below.

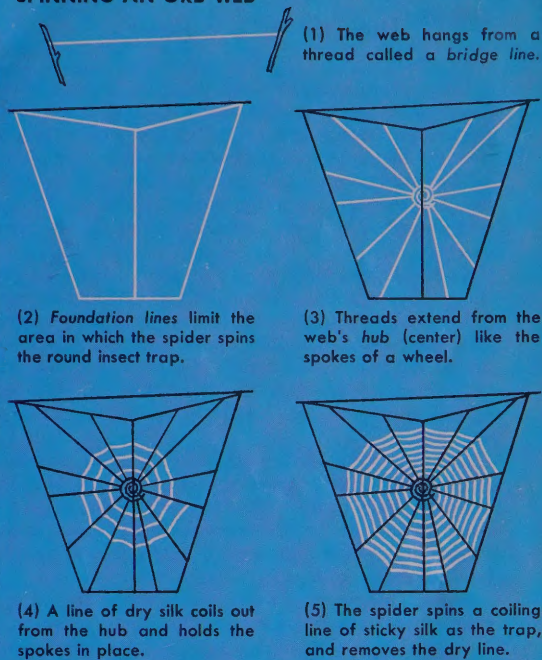
Orb Weavers build the most beautiful and complicated of all webs. They weave their round webs in open areas, often between tree branches or flower stems. An orb web consists of threads of dry silk that extend from the web's center like the spokes of a wheel. Coiling lines of sticky silk connect the spokes, and serve as an insect trap.

Some orb weavers lie in wait for their prey in the center of the web. Others attach a *trap line* to the center of the web. The spider hides in its nest near the web, and holds on to the trap line. When an insect lands in the web, the line vibrates. The spider darts out and captures the insect. Many orb weavers spin a new web every night. It takes them about an hour. Other orb weavers repair or replace damaged parts of their webs.



Beautiful Orb Weavers include the silk spider, shown half its actual size at the left; the marbled spider, above right; and the arrowhead-shaped micrathena, below right.

SPINNING AN ORB WEB



WORLD BOOK diagram



The Orange Garden Spider spins a large orb web that may measure more than 2 feet across. The spider spins a zigzagging band of silk across the middle of the web.

SPIDER / The Life of a Spider

Each species of spider has a different life story. Many kinds of spiders live only about a year. Large wolf spiders live several years. Certain kinds of tarantulas live the longest—more than 20 years. Spiders become adults at different times of the year. Some mature in the fall, and then mate and die during the winter. Others live through the winter, mate in the spring, and then die.

Courtship and Mating. As soon as a male spider matures, it seeks a mate. The female spider may mistake the male for prey and eat him. But most male spiders perform courtship activities that identify themselves and attract the females. The male of some species vibrates the threads of the female's web. Some male hunting spiders wave their legs and bodies in an unusual courtship dance.

Before mating, a male spider spins a silk platform. He deposits a drop of sperm from his abdomen onto the platform. Then he fills each of his pedipalpi with sperm. After mating, the female stores the sperm in her body. When she lays her eggs, several weeks or even months later, the eggs are fertilized by the sperm.

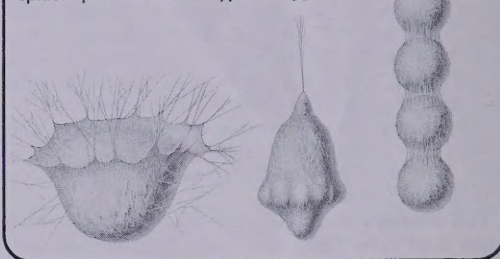
Eggs. The number of eggs that a spider lays at one time varies with the size of the animal. A female of average size lays about 100 eggs. Some of the largest spiders lay more than 2,000 eggs. One tiny female cave spider lays only one egg at a time. It is about a fourth the size of her body.

In most species, the mother spider encloses the eggs in a silken egg sac. The sac of each species differs in



Courtship Dances are performed by many male hunting spiders to attract mates. The jumping spider *Peckhamia noxiosa*, left, raises its abdomen into the air and sways from side to side. The wolf spider *Pardosa milvina*, right, waves its front pair of legs.

Spider Egg Sacs are made of a special kind of silk that is often strong and waterproof and may be colored. Each kind of spider spins a different type of egg sac.



size and shape. Some species that lay large numbers of eggs make several sacs, and some spin them together into a long chain.

In many species, the mother dies soon after making the egg sac. In other species, she stays with the eggs

COMMON KINDS OF SPIDERS

Each of the spiders listed in this table is shown in the pictures with this article.

TRUE SPIDERS

Comb-Footed Spiders (Theridiidae)

- Black Widow (*Latrodectus mactans*)
- Comb-Footed Spider (*Mysmena incredula*)
- Common House Spider (*Achaearanea tepidariorum*)

Crab Spiders (Thomisidae)

- Crab Spider (*Misumena vatia*)

Fisher Spiders (Pisauridae)

- Fisher Spider (*Pisaurina mira*)

Funnel-Web Spiders (Agelenidae)

- Grass Spider (*Agelena naevia*)
- Water Spider (*Argyroneta aquatica*)

Hackled-Band Orb Weavers (Uloboridae)

- Triangle Spider (*Hyptiotes cavatus*)

Jumping Spiders (Salticidae)

- Jumping Spider (*Peckhamia noxiosa*)
- Jumping Spider (*Phidippus variegatus*)

Ogre-Faced Stick Spiders (Deinopidae)

- Ogre-Faced Stick Spider (*Deinopis spinosus*)

Orb Weavers (Argiopidae)

- Arrowhead-Shaped Micrathena (*Micrathena sagittata*)
- Bolas Spider (*Mastophora cornigera*)

Labyrinth Spider (*Metepeira labyrinth*)

Marbled Spider (*Araneus marmoreus*)

Orange Garden Spider (*Argiope aurantia*)

Silk Spider (*Nephila clavipes*)

Spiny-Bodied Spider (*Gasteracantha cancriformis*)

Sheet-Web Weavers (Linyphiidae)

Bowl-and-Doily Spider (*Frontinella pyramitela*)

Filmy Dome Spider (*Linyphia marginata*)

Platform Spider (*Microlinyphia mandibulata*)

Wolf Spiders (Lycosidae)

Wolf Spider (*Lycosa punctulata*)

Wolf Spider (*Pardosa milvina*)

TARANTULAS

Purse-Web Spiders (Atypidae)

Purse-Web Spider (*Atypus abboti*)

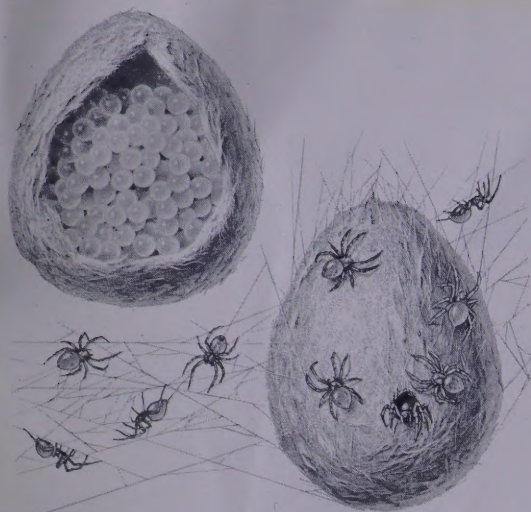
Tarantulas (Theraphosidae)

Tarantula of South America (*Lasiodora*)

Tarantula of the United States (*Aphonopelma chalcodes*)

Spiders belong to the phylum Arthropoda, and to the class Arachnida. They make up the spider order Araneae. True spiders belong to the suborder Labidognatha. Tarantulas belong to the suborder Orthognatha.

To learn how spiders fit into the animal kingdom, see ANIMAL (table: A Classification of the Animal Kingdom).



Spiderlings hatch from pearly white eggs inside the egg sac. One by one, they leave the egg sac through a tiny hole that they tear in its side. They immediately begin spinning draglines. Many spiderlings then travel to other areas, usually by ballooning.

until they hatch. Some spiders hang the sac in a web. Others attach the sac to leaves or plants. Still others carry it with them. The female wolf spider attaches the sac to her spinnerets, and drags it behind her wherever she goes.

Spiderlings hatch inside the egg sac and remain there until warm weather arrives. If the eggs are laid in autumn, the spiderlings stay quietly inside their egg sac until spring. After leaving the egg sac, the spiderlings immediately begin spinning draglines.

Many spiderlings travel to other areas. To do this, a spiderling climbs to the top of a fence post or some other tall object and tilts its spinnerets up into the air. The moving air pulls silk threads out of the spinnerets. Then the wind catches the threads and carries the spiderling into the air like a balloon on a string. This unusual way of traveling is called *ballooning*. A spider may travel a few feet or many miles by ballooning. Sailors more than 200 miles from land have seen ballooning spiders floating through the air.

Spiderlings *molt* (shed their outer skin) several times while they are growing. A new, larger skin replaces the skin that has grown too tight. Most kinds of spiders molt from five to nine times before they reach adulthood. Tarantulas molt more than 20 times, but dwarf spiders molt only a few times.

Enemies of spiders include snakes, frogs, toads, lizards, birds, fish, and many other animals that also eat insects. Even some insects eat spiders. The wasp, for example, is one of the spider's worst enemies (see *WASP [Solitary Wasps]*). One group of spiders called *pirate spiders* eats only other spiders. Pirate spiders do not spin webs, but creep into the webs of other spiders and kill them.

H. K. WALLACE

Critically reviewed by WILLIS J. GERTSCH

SPIDER / Study Aids

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- C. Chelicerae
- D. Pedipalpi
- E. Legs

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- A. How Spiders Make Silk
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- A. Tangled-Web Weavers
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V. The Life of a Spider

- A. Courtship and Mating
- B. Eggs

C. Orb Weavers

- C. Spiderlings
- D. Enemies

Questions

- What is ballooning?
- What are some of the ways in which spiders use silk?
- How do tarantulas differ from true spiders?
- How does an orb weaver know that an insect has landed in its web?
- How do spiders differ from insects?
- How many kinds of spiders in the United States can harm man?
- How does a female wolf spider carry her egg sac?
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